

The effect of e-procurement on financial performance: Moderating the role of competitive pressure

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ABSTRACT

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The importance of E-procurement is significant for the development of nations. Findings of previous studies in terms of predictors and consequences of using E-procurement are inconsistent and most prior literature were conducted in developed countries. The purpose of this study is to examine the predictors and consequences of using e-procurement. Based on resource-based view (RBV) and Technology-Organization-Environment framework (TOE), the study proposed that technological (relative advantage, compatibility, and complexity) and organizational factor (top management support, organizational readiness, and Information System (IS) committee) will have significant effect on e-procurement which in turn expected to affect the firm performance. Competitive pressure is proposed as a moderating variable between technological and organizational factors, and e-procurement. The population of the study includes large companies in Jordan. Purposive sampling was deployed to collect the data using a questionnaire. The findings were derived from 221 responses. Data analysis was conducted using Smart PLS. The findings showed that technological (relative advantage, compatibility, and complexity) and organizational (top management support and organizational readiness) have significant effect on e-procurement which in turn affected firm performance. Competitive pressure did not moderate the effect of technological and organizational factors on e-procurement. The findings help the policy makers in Jordan to increase the usage of e-procurement and firm performance by focusing on the benefits and reducing the complexity of using a new technology.

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1. Introduction

The invention of the internet in the last century has affected the way of doing business. Currently, the competition among organizations is high. One of the methods to confront the increasing competition is the deployment of an innovation that can increase the competitive advantage and reduce the cost (Shatta et al., 2020). The use of information technology has been the norm of the 21st century. This technology has been used in various fields and sectors. Countries and organizations have increasingly used e-commerce to facilitate e-business. One of the important applications of using the technology is electronic procurement (E-procurement). E-procurement is a business to business (B2B) and it refers to the integration of IT systems for conducting the procurement activities using electronic methods (Aminah et al., 2018; Belisari et al., 2019). E-procurement enables organizations to lower business costs, lower consumption time, streamline consuming processes, and to access broader markets (Gascó et al., 2018; Jain et al., 2018; Tiwari et al., 2019).

Firms use e-procurement to create a competitive advantage by reducing the cost and confront the increasing competition in the market (Luay Daoud & Ibrahim, 2019, 2018). Globally, the significance of e-procurement has increased with an overall volume of \$11 trillion US dollars in 2020 which constitutes 12% of the global GDP. Approximately, 75% of the global e-procurement is dominated by US and western countries (Luay Daoud & Ibrahim, 2019). In the Middle East, the volume of e-procurement is estimated at \$16 billion. Jordan's share remains weak as the turnover amounted to about \$6 billion US dollars (Nurdin, 2021) which indicates that the progress of e-procurement usage is slower in Jordan and still in early stages compared to other developing and developed countries (Daoud, 2019).

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The national agenda of the Jordanian government aims to make the economy of Jordan is knowledge based (A. K. Alsaad, 2015). The government has launched several initiatives to encourage companies to use the E-procurement. However, there is still a need for more effort to improve the firm performance (Alrousan & Jones, 2016). A governmental agency conducted a survey and found that only 27.6% of private companies are using E-procurement. The reasons for not using it were related to technological factors, organizational and environmental.

The private sector contributes more than 70% of employment opportunities and more than 40% of total national Gross Domestic Product (GDP) in Jordan, these indicators demonstrate the crucial roles of the private sector with respect to the wealth and prosperity of Jordan. However, the performance of the private sector is still underperforming its potential and is facing difficulties and a decline in performance (Daoud, 2019). The unemployment rate in Jordan reached 15.8% at the end of 2016 and increased to 19% in 2021 (Imam, 2022). In addition, the growth rate of Jordanian GDP was 1.80% in 2018 compared with 2.6% in 2016. Furthermore, the foreign investment in Jordan decreased by 5.3% in 2017 compared with 2016 (Imam, 2022).

Jordan as a country occupied the rank of 60th in terms of using ICT (Silva et al., 2022). In addition, it has been evidenced that e-procurement usage accounts for the largest share of business revenue in developed countries such as the US and some developing countries like China and India (Aminah et al., 2018; Gascó et al., 2018). However, the progress of e-procurement usage is slower in Jordan and still in the early stages compared to other developing and developed countries (Luay Daoud & Ibrahim, 2018). Using e-procurement is critical for companies to improve their performance. Based on the Resource-Based View (RBV) theory, intensive usage of IT such as an e-procurement system might lead to a greater level of value and positively influence on the firm performance (Abdelbadie & Salama, 2019; Yusr, 2016). Due to weak and slow IT innovation adoption, several studies were conducted to understand the barriers that affect the usage (Bobowski & Gola, 2018; Saastamoinen et al., 2018; Truong, 2019). E-procurement usage in the Jordanian private sector has only recently gained attention in academia (Alrousan & Jones, 2016; Alsaad, 2015; Luay Daoud & Ibrahim, 2019, 2018).

Further, existing theories were developed and tested in developed countries and these theories need to be modified to suit the context of developing countries (Afolabi et al., 2019; Shatnawi et al., 2022; Marei & Iskandar, 2019; Marei et al., 2021; Nani & Ali, 2020). This is because issues that might seem insignificant for developed countries may play important roles for e-procurement usage in developing countries (AlNuaimi et al., 2021; Brandon-Jones & Kauppi, 2018; Masudin et al., 2021). Therefore, the need to understand whether existing theories can be applied in developing countries is a critical issue (Alsaad, 2015). The Diffusion of Innovation (DOI) Theory and Technological, Organizational, and Environmental (TOE) framework provides a strong basis for the study of B2B IT in developing countries (Luay Daoud & Ibrahim, 2019, 2018). Mixed findings were derived from previous studies regarding the predictors and consequence of using E-procurement (Alrousan & Jones, 2016; Alsaad, 2015; Chibani et al., 2018; Luay Daoud & Ibrahim, 2018; Ibem et al., 2018; Truong, 2019). Researchers indicated that there are mixed findings in terms of the usage and consequence of using E-procurement (Afolabi et al., 2019; Nurdin, 2021; Saastamoinen et al., 2018).

The inconsistent results in previous studies have led to difficulties in understanding the influence of different factors that affect the usage of e-procurement. For these reasons, several studies aimed to find the predictors and the reasons for the mixed findings (Akaba et al., 2020; Brandon-Jones & Kauppi, 2018; Ramkumar et al., 2019; Sánchez-Rodríguez et al., 2019). To overcome the above-mentioned research gaps, this study explores e-procurement usage in Jordan, focusing specifically on the range of e-procurement functionalities used in the large firms from the information and transaction perspectives. This study is aimed at widening the present literature by examining the moderating role of competitive pressure on TOE factors. They deploy the TOE and include the technological factors, which include relative advantage, compatibility, and complexity. The organizational factors include top management support, organizational readiness, and the IS committee; the environmental factors include competitive pressure which is deployed as a moderator in this study. Next sections discuss the literature review, methodology, findings, discussion, implications, and conclusion.

2. Literature Review and Hypotheses Development

2.1 Predictors of E-procurement

The procedure of IT innovation usage has been categorized into many stages by different researchers. Generally, these stages can be divided into two which are the initial adoption stage and the usage intensity (Hameed et al., 2012; Rogers, 2003). The stages are affected by enablers or barriers. Researchers have no agreement in terms of the enablers. Factors such as infrastructure, technology, organizational and management characteristics, and resource constraints have served as barriers to e-procurement acceptance (Y. Chen et al., 2021; Masudin et al., 2021; Sánchez-Rodríguez et al., 2019). Technical issues such as a lack of technological infrastructure (Alrousan & Jones, 2016; Alsaad, 2015; Truong, 2019), and inventory management and accounting (Belisari et al., 2019; Gascó et al., 2018; Ibem et al., 2021) may arise when integrating e-procurement with current information infrastructure. Data quality, technological integration, system-to-system integration, and ICT have been identified as major challenges for many companies when using e-procurement systems (Aminah et al.,

2018; Gascó et al., 2018; Jain et al., 2018). The second stage (the post-adoption stage) can be considered as e-procurement diffusion, describing the intensity with which e-procurement technology is assimilated into the operation of a firm or the level of e-procurement intensity (Bobowski & Gola, 2018; Iben et al., 2018; Saastamoinen et al., 2018). Numerous studies believe that the adoption of e-procurement is highly related to variables such as relative advantage, compatibility, and complexity. In addition, other factors include the top management support, readiness, and IC committee (Luay Daoud & Ibrahim, 2019; Iben et al., 2018, 2021). In this study, the predictors of e-procurement are examined in the context of companies in Jordan.

2.2 Consequence of E-procurement usage

Several studies examined the consequence of adopting IT and these studies mainly related the effect of using the IT on firm performance to the RBV theory which suggested that companies can use their resources and capabilities to create competitive advantages and increase their performance (Alaaraj et al., 2018). E-procurement gives a positive impact on firm performance and the influence of e-business adoption on banking performance from the perspective of communications, internal operations, and coordination, and sales-services-marketing (Hassan et al., 2017; Teo et al., 2009). There is supporting result in terms of the relationship between the IS usages and the performance of companies (Luay Daoud & Ibrahim, 2019; Saastamoinen et al., 2018; Tiwari et al., 2019).

Teo and Lai (2009) found that e-procurement usage had a positive influence on cost reduction. While the results showed an insignificant relationship between e-procurement usage and internal efficiency, managerial effectiveness, and impact on coordination. E-procurement can increase managerial effectiveness in day-to-day operations (Afolabi et al., 2020; Mélon, 2020). Using IT can help companies to reduce cost and increase their profitability. Further, the use of technology can help in improving the efficiency of supply chain management and create several competitive advantages. In this regard, several studies have shown empirically that using IT will enhance firm performance. The influence of e-procurement usage on Jordanian firm's performance is relatively limited by the previous studies. Hence, this current study tries to fill this gap by investigating the influence of e-procurement usage on the performance of Jordanian firms. Based on Teo et al. (2009), the impacts of e-procurement usage related to cost reductions, internal efficiency, managerial effectiveness, and coordination had never been used in Jordanian firms.

2.3 Theoretical Framework

This study examines the predictors and consequences of using e-procurement. The predictors can be explained using several theories. However, on the organizational level, TOE which includes technological, organizational, and environmental factors are critical in explaining the adoption on the organizational level from three perspectives. Most of studies that have deployed the TOE has included the variables of diffusion of innovation (DOI) which includes relative advantage, compatibility, trialability, observability and complexity. The results of previous studies indicate that the most significant factors that affect innovation evaluation are relative advantage, compatibility, and complexity (Shaltoni & Shaltoni, 2017; Stieninger et al., 2014). Tornatzky and Fleischer (1990) constructed the TOE. Results have shown that, with respect to technological innovation, organizations with assured administration and organizational characteristics are more likely to use IS (Oliveira et al., 2014). The TOE and DOI are deployed in this study to explain the usage of technological and organizational as well as environmental factors such as competitive pressure which is acting in this study as a moderator.

Explaining the consequence of adopting E-procurement, the RBV assumes that deploying effectively the resources and capabilities of companies can lead to better organizational performance (Arshad et al., 2015; Gupta et al., 2018). The RBV provides a theoretical basis for linking IT systems such as e-procurement usage with their perceived impacts (L Daoud et al., 2021). The RBV of a firm posits that firms create value and impact by combining various resources that are economically difficult to imitate or are valuable across firms (Barney, 1991). The greater the use, the more likely the firm is to develop a unique impact from its innovation (Kozlenkova et al., 2014; Zhu & Kraemer, 2005). RBV has been used in several studies to explain the effect of IT capabilities on firm performance (Alaaraj et al., 2016). TOE and RBV were combined in a few studies (Salwani et al., 2009) and this study will combine these two theories to explain the e-procurement usage and its impact on firm performance.

2.4 Conceptual Framework and Hypotheses Development

Based on the TOE and RBV, this study proposed that the effect of technological factors and organizational factors on e-procurement usage is positive. The study also proposed that the effect of e-procurement on firm performance is positive. Competitive pressure is expected to moderate the effect of individual and technological factors on the e-procurement usage.

2.4.1 Technological Factors

TOE proposed that technological factors are critical for the adoption of a new technology. In line with TOE, previous studies found positive association between technological factors and the technology adoption (Gangwar, 2017; Sabi et al., 2016). Thus, this study proposed the following:

H₁: *Technological factors positively affect e-procurement.*

2.4.1.1 Relative Advantage

Relative advantage refers to the benefits that can be achieved by using the E-procurement (Rogers, 2003). Companies that perceived the adoption of e-procurement as beneficial will attempt to deploy this technology. There are mixed results in the literature. Previous studies found a positive link between relative advantage and usage of E-procurement (Liu et al., 2011). However, studies have shown that the influence of relative advantage on innovation usage is inconsistent (Alomar & Visscher, 2017; Hameed & Counsell, 2014; Mohtaramzadeh et al., 2018). In this study, a positive link is assumed between relative advantage and e-procurement.

H_{1a}: *Relative advantages affect e-procurement positively.*

2.4.1.2 Compatibility

Compatibility refers to the consistency of e-procurement with the existing system in the company. Many studies that considered compatibility as one of the factors affecting IT innovation have found that compatibility is among the top determinants of IT innovation usage (Shukur et al., 2018). Findings of previous studies in terms of compatibility are mixed. Compatibility affected positively the E-procurement usage (Ibrahim, 2012) while others found insignificant effect (Ifinedo, 2011; Oyewobi et al., 2021). In this study, compatibility is proposed to have a significant positive effect on e-procurement.

H_{1b}: *Compatibility affects the e-procurement positively.*

2.4.1.3 Complexity

Rogers (2003) refers to complexity as the difficulty of using a new technology. Complex technology will not be used by users (Al-Hudhaif & Alkubeyyer, 2011). Studies found that there is a negative link between complexity and using a new technology (Chen, 2017). Alsaad et al. (2017) found that complexity has a negative effect on the adoption of technology. In this study, complexity is expected to have a negative effect on e-procurement.

H_{1c}: *Complexity negatively affects e-procurement.*

2.4.2 Organizational Factors

The organizational factors represent different mechanisms, structures, and characteristics that influence the propensity of usage innovation (Tornatzky & Fleischer, 1990). Organizational factors have been proposed to have a significant effect on the adoption of technology in several studies (Kayali & Alaaraj, 2020). In this study, the organizational factors are expected to have a significant effect on the e-procurement usage.

H₂: *Organizational factors affect e-procurement positively.*

2.4.2.1 Top Management Support

The support of management is critical for effective deployment of technology (Alsaad et al., 2017; Oliveira et al., 2014). Top management support involves supporting projects financially by investing in these projects as well as showing consistent commitment toward the project (Teo et al., 2009). Stronger support of management led to allocating resources to support the adoption of E-procurement (Oliveira et al., 2014). This study proposed that top management support will have a positive effect on e-procurement.

H_{2a}: *Top management support affects the e-procurement positively.*

2.4.2.2 Organizational Readiness

Organizational readiness refers to the existence of required skills and technological requirements for the usage of a new technology (Zhu et al., 2006). Prior literature found that organizational readiness is critical for e-procurement. For instance, previous studies (Alomar & Visscher, 2017) found positive effect while insignificant effect was found in other studies (Alsaad et al., 2017; Hameed & Counsell, 2012). This study proposes that the effect of organizational readiness on e-procurement is positive and significant

H_{2b}: *Organizational readiness has a positive effect on e-procurement.*

2.4.2.3 IS Committee

Ibrahim (2012) indicated that the IS committee comprises a group of IT experts in the business who understand and are committed to the mission and vision and strategic planning of IT in the business. The IS committee is critical to establish companies that are committed to use e-procurement (Brandon-Jones & Carey, 2011). Ibrahim (2012) found an insignificant relationship between an IS committee and e-procurement usage among Malaysian suppliers. In this study, the IS committee is proposed to have a positive effect on E-procurement in Jordan.

H_{2c}: *IS committee has a positive effect on E-procurement.*

2.4.3 E-Procurement and Firm Performance

The primary objective of any IS initiative is to improve the quality of the interaction in organizations through enhanced efficiency, accuracy, time and cost saving, transparency, and better processes and systems (Moon, 2002). Organizations increasingly try to improve their performance by using IT that smooths and improves the sharing of information, transactions and strengthens coordination with trading partners (Lin & Lin, 2008). Several previous studies have shown a positive relationship between IT usage and firm performance (Ibrahim, 2012; Teo et al., 2009). The prior studies investigating the advantages of e-procurement usage frequently cite the impacts on cost reduction, managerial effectiveness, coordination improvement and internal efficiency (Teo et al., 2009). Hence, based on RBV theory, the present study expects that e-procurement usage will have a relationship with firm performance. This leads to the hypothesis as below:

H₃: *E-procurement usage has a positive influence on the firm performance.*

2.4.4 Competitive Pressure

Businesses tend to be more responsive and conscious about the operations of rivals in the 21st century especially because of worldwide conditions (Awa et al., 2012; Nwankpa, 2020). In the current competitive business environment, the need for goods or services is forecast based on the degree of competitive strength (Ifinedo, 2011). Due to the competition between firms, an organization may seek the latest technologies without having specific knowledge about their usage (Abed, 2020). Competitive pressure deployed as a moderating variable in a limited number of studies. For instance, the adoption of social media as a tool for marketing was moderated by the competitive pressure in the industry (Ali Abbasi et al., 2022). In addition, previous studies also found that competitive pressure moderated the effect of top management supporting e-marketing adoption (Sheikh et al., 2018). Accordingly, in this study, it is expected that competitive pressure will moderate the effect of technological and organizational factors on the e-procurement usage.

H₄: *Competitive pressure moderates the effect of technological factors on e-procurement usage.*

H₅: *Competitive pressure moderates the effect of organizational factors on e-procurement usage.*

3. Research Methodology

This study is quantitative in nature. The study deploys a survey design to achieve the objectives. The population of this study are the 684 companies that have adequate capital and use IT B2B systems (Alsaad et al., 2017). Since the population is relatively small, the sample included all the population with registered capital equal to or exceeding 5,000,000 Jordanian dinar (JD). The instrument of this study is a questionnaire. The questionnaire was adopted from prior literature. E-procurement usage is measured by the range of e-procurement functionalities used within an organization (Hassan et al., 2014). Firm performance measurement was adopted from Teo and Lai (2009). In addition, factors of relative advantage, compatibility, and complexity were adopted from Rogers (2003). Top management support was adopted from (Sulaiman & Magaireah, 2014), IS committee from Ibrahim (2012), and organizational readiness were adopted from (Yang et al., 2015), and competitive pressure from (Ahani et al., 2017; Awa et al., 2012), E-procurement was adopted from (Hassan et al., 2017; Teo et al., 2009).

The measurement was first translated into Arabic and validated by three experts who can understand Arabic and English. A pilot study was conducted to assess the reliability and it is found that all the measurements are reliable due to the notion that Cronbach's Alpha is greater than 0.70. An online questionnaire was sent to respondents using their contact information on the company websites and the directors of companies in Jordan. 509 questionnaires were mailed out. Follow up and reminders were sent. After three months, the 238 responses were collected. The data was analysed for missing values, outliers, normality, and multicollinearity. Five responses were incomplete and thus were omitted. The researcher removed 12 outliers. The data is normally distributed because Skewness and Kurtosis are less than absolute one (1) as shown in Table 1 and there are no multicollinearity issues because variation inflation factor (VIF) is less than five (5) and tolerance is greater than 0.20. Therefore, 221 questionnaires were subjected to analysis. This accounted for a valid response rate of 43%.

Table 1
Normality and Multicollinearity Analysis

Variable	No. Items	Skewness	Kurtosis	Tolerance	VIF
Relative advantage	6	-.202	.109	.517	1.933
Compatibility	5	.078	-.216	.452	2.976
Complexity	5	-.333	-.150	.752	1.329
Organizational readiness	4	.115	-.406	.311	2.220
IS Committee	3	-.229	-.932	.506	1.976
Competitive pressure	5	.187	-.024	.389	2.571
Top management support	6	-.698	-.627	.478	2.594
E-procurement	6	-.146	.333	.834	1.199
Firm Performance	6	.210	-.219		

4. Findings

The findings of this study include the descriptive information of organizations and respondents as well as the data analysis using SmartPLS.

4.1 Descriptive Information of Organizations and Respondents

A total of 221 organizations have participated in this study. The majority are from the service sector (52.5%) with a length of business operation of more than 15 years (53.8%) and 70.6% are owned by nationals. 56.1% have sales of more than JD 15 million. Out of 221, 87.3% are of the respondents were males, 57.5% or 127 respondents were between 41 and 50 years old. 56.1% of the respondents were holders of a bachelor's degree and 71.5% had experience as a manager or purchasing manager for more than 10 years. 83.7% of the respondents were purchasing managers.

4.2 Assessment of Measurement Model

The measurement model was assessed by examining the factor loading (FL), reliabilities such as Cronbach's Alpha (CA) and composite reliability (CR) which are expected to be larger than 0.70 (Hair et al., 2017). In this study, some items were removed due to low FL. The CA and CR achieved the required level of greater than 0.70. For the convergent validity, it was achieved as shown in Table 2 because the average variance extracted (AVE) is greater than 0.50. Lastly, the discriminant validity is achieved when the calculation of the square root of AVE is greater than the correlation between the factors making each pair. As shown in Table 2 all the square roots of AVE are greater than the cross loading.

Table 2
Result of the Measurement Model (Factor Loading, CA, CR, and AVE)

Variables	CA	CR	AVE	RA	CO	COX	OR	ISC	CP	TMS	EP	FP
Relative Advantage	0.948	0.958	0.791	0.88								
Compatibility	0.926	0.944	0.773	0.72	0.94							
Complexity	0.969	0.976	0.891	-0.35	-0.31	0.94						
Organizational readiness	0.955	0.967	0.881	0.80	0.73	-0.35	0.84					
IS committee	0.941	0.962	0.894	0.61	0.68	-0.36	0.65	0.95				
Competitive pressure	0.936	0.959	0.886	0.64	0.60	-0.22	0.67	0.47	0.93			
Top management support	0.966	0.972	0.853	0.71	0.63	-0.29	0.70	0.59	0.62	0.94		
E-procurement	0.966	0.970	0.712	0.50	0.49	-0.32	0.59	0.52	0.39	0.52	0.89	
Firm Performance	0.923	0.951	0.867	-0.06	-0.15	0.09	-0.09	-0.21	-0.09	-0.17	-0.16	0.92

4.3 Structural Model

The structural model can be assessed by examining the explanatory power (R-square). The analysis indicated that the R-square for E-procurement was 0.66 indicating that the variables can explain 66% of the e-procurement which in turn can explain 67% of the firm performance. For the predictive relevance, the Q-square is 0.43 which is greater than zero indicating the independent variables can predict the dependent variables. All the effect sizes are greater than 0.02 except for the effect of the IS committee and the moderating effect of competitive pressure. These paths were not satisfactory, and this could be due to the notion that the hypotheses of these paths are not supported. For hypothesis testing, this study includes direct and moderating hypotheses. Table 3 shows the path coefficient (β) and standard deviation (Std. Error) as well as the T-value (t) and the P-value (p) of the direct effect model. Discussion of the results of each hypothesis (H) is given in upcoming sections.

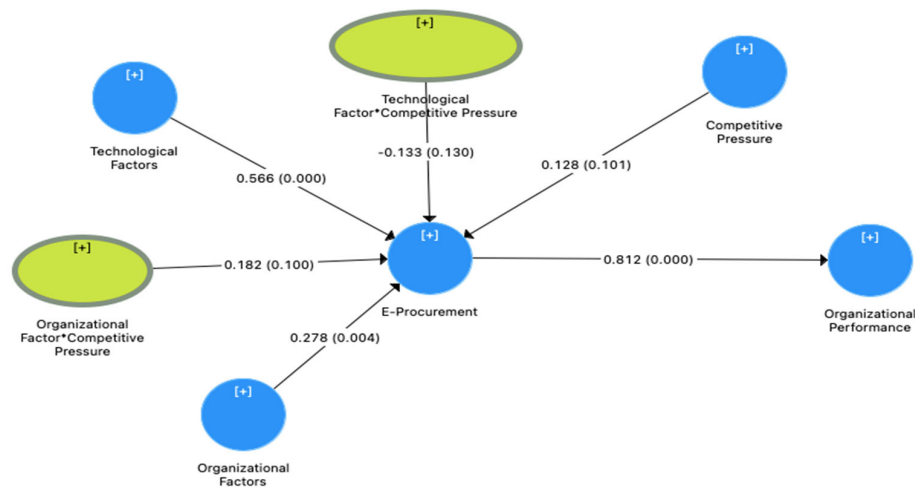
The first main hypotheses predicted that the effect of technological factors and its dimension are significant. The prediction is true. As shown in Table 3, the effect of technological factors and its dimensions relative advantage, compatibility, and complexity are significant. Therefore, H1, H1a, H1b, H1c are supported. For the second main hypothesis, the effect of organizational factors and its dimension was proposed to be significant. The findings in Table 3 showed that the hypotheses

are supported for top management support and organizational readiness but not for the IS committee. Therefore, H2, H2a, H2b are supported while H2c is rejected. For H3, the hypothesis suggested that the effect of e-procurement on firm performance is significant. The findings indicated that the effect is significant, and the hypothesis is supported. Therefore, H3 is supported.

Table 2**Path Coefficient of Direct Effect Model**

H	Relationship	Std. Beta	Std. Error	T-value	P-value	Result
H1	Technological factors→E-procurement	0.592	0.078	7.706	0.000	Supported
H1a	Relative Advantage → E-procurement	0.112	0.046	2.436	0.008	Supported
H1b	Compatibility → E-procurement	0.211	0.053	3.952	0.000	Supported
H1c	Complexity → E-procurement	-0.197	0.037	3.742	0.000	Supported
H2	Organizational factors→E-procurement	0.329	0.077	4.222	0.000	Supported
H2a	Top management support →E-procurement	0.144	0.068	2.114	0.035	Supported
H2b	Organizational Readiness → E-procurement	0.141	0.056	2.503	0.006	Supported
H2c	IS Committee → E-procurement	0.068	0.060	1.113	0.258	Rejected
H3	E-procurement → Firm performance	0.777	0.031	24.686	0.000	Supported

For the moderating effect of competitive pressure. The findings as shown in Fig. 1 indicate that competitive pressure did not moderate the effect of technological or organizational factors on the firm performance. The P-value for the moderating effect of competitive pressure between technological factor and E-procurement is 0.130 which is greater than 0.05 indicating that H4 is rejected. Similarly, for H5, the effect of organizational factors on e-procurement is not moderated by competitive pressure. Thus, H5 is rejected.

**Fig. 1.** Moderating Effect of Competitive Pressure

5. Discussion

The aim of this study is to identify the predictor and consequence of using E-procurement. The findings showed that relative advantage and compatibility influenced positively e-procurement usage while complexity influenced negatively e-procurement usage. The findings in this study are consistent with findings reported in the literature on IT adoption and use (Alsaad et al, 2017; Ibrahim, 2012; Teo et al., 2009). This result supports Roger's (2003) argument that a characteristic of an innovation influences a usage decision. The organizational context of the TOE framework and the factors from the organizational context were included in the research model. The most important factor describing the organizational context was top management support followed by organizational readiness. The IS committee was found as an insignificant factor in Jordanian context. The present findings in terms of the effect of IS committee are in line with Ibrahim (2012), who found an insignificant relationship between IS committee and e-procurement usage among Malaysian suppliers. In terms of the moderating effect of competitive pressure, the study did not find a moderating role of competitive pressure. These findings are inconsistent with the findings of (Ali Abbasi et al., 2022; Sheikh et al., 2018). However, this could be due to the notion that e-procurement is still relatively new in Jordan and competition has not increased so far. E-procurement positively affected the firm performance. This finding is consistent with previous studies such as Ibrahim (2012), and Teo and Lai (2009). This finding is in line with the RBV theory which indicated that the use of technology will lead to better competitive advantage and better firm performance (Alaaraj et al., 2018).

6. Implications

The study has contributed to the literature in several areas. Testing the TOE framework and deploying competitive advantage as a moderator has helped in confirming the validity of TOE. This study also fills the gaps regarding the inconsistency of the findings of previous studies and confirmed the factors that affect the usage of e-procurement. The validity of RBV was also confirmed along with TOE. The two theories are valid in the context of e-procurement in Jordan and can explain a significant part of the variation in e-procurement and firm performance.

The study contributes to the agenda of the government of enhancing the usage of ICT and improving employment in this sector. Based on the empirical findings, top management should reflect on their readiness in using e-procurement and be reminded that various inertias in their resources have to be overcome to use e-procurement effectively. This study can contribute to institutions in Jordan by enlightening them about the significant impacts of technological innovations in facilitating firm performance. Also, this study explains technological innovations as fundamental survival characteristics of a firm that aims to obtain a strategic position in the market. Because the decisions of managers on e-procurement usage can impact B2B operations, managers must acquire the knowledge of individual components in the conceptual models for better decision-making. Thus, when a decision on IS adoption is made, managers must ensure that positive influences are made on firm performance.

Moreover, the Jordanian policymakers who are interested in improving their organizational performance through the usage of e-procurement can benefit from this study as it addresses the influence of e-procurement on firm performance and the factors that will facilitate the use of e-procurement. The findings of this research study have many implications for different industries. The increasing numbers of firms that use e-procurement can be an opportunity to develop a system or applications that relates with e-procurement, which in return will give advantages for firms to improve and enhance their business performances.

7. Conclusion

This study examined the predictors and consequences of e-procurement. The findings were derived from companies operating in Jordan. The data analysis showed that technological and organizational factors have significant effects on e-procurement which in turn affected the firm performance. There are some limitations that can be used for future work. The study collected the data using purposive sampling. Thus, the findings can be generalized to companies that have participated in this study. This study has focused on only one relationship characteristic between TOE factors and e-procurement usage, namely, competitive pressure. Future research can include other variables such as trust, dependency, power, strategic sourcing, and other characteristics. In addition, this study investigated only a limited number of TOE factors on firm use of e-procurement. Observability, trialability, organization slack, firm size, and vendor support can be also direction for further research. Furthermore, this study investigated the role of e-procurement in the firm performance through cost reduction, internal efficiency, managerial effectiveness, and coordination perspective. Future research may consider the influence of e-procurement usage on financial performance.

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References

- Abdelbadie, R. A., & Salama, A. (2019). Corporate governance and financial stability in US banks: Do indirect interlocks matter? *Journal of Business Research*, 104(June), 85–105. <https://doi.org/10.1016/j.jbusres.2019.06.047>
- Abed, S. S. (2020). Social commerce adoption using TOE framework: An empirical investigation of Saudi Arabian SMEs. *International Journal of Information Management*, 53(March). <https://doi.org/10.1016/j.ijinfomgt.2020.102118>
- Afolabi, A., Ibem, E., Aduwo, E., & Tunji-Olayeni, P. (2020). Digitizing the grey areas in the Nigerian public procurement system using e-Procurement technologies. *International Journal of Construction Management*, 1–10.
- Afolabi, A., Ibem, E., Aduwo, E., Tunji-Olayeni, P., & Oluwunmi, O. (2019). Critical success factors (CSFs) for e-Procurement adoption in the Nigerian construction industry. *Buildings*, 9(2), 47.
- Ahani, A., Rahim, N. Z. A., & Nilashi, M. (2017). Forecasting social CRM adoption in SMEs: A combined SEM-neural network method. *Computers in Human Behavior*, 75, 560–578. <https://doi.org/10.1016/j.chb.2017.05.032>
- Akaba, T. I., Norta, A., Udokwu, C., & Draheim, D. (2020). A framework for the adoption of blockchain-based e-procurement systems in the public sector. *Conference on E-Business, e-Services and e-Society*, 3–14.
- Al-Hudhaif, S., & Alkubeyyer, A. (2011). E-commerce adoption factors in Saudi Arabia. *International Journal of Business and Management*, 6(9), 122.
- Alaaraj, S., Mohamed, Z. A., & Bustamam, U. S. A. (2018). External growth strategies and organizational performance in emerging markets: The mediating role of inter-organizational trust. *Review of International Business and Strategy*.

- Alaarij, S., Abidin-Mohamed, Z., & Bustamam, U. S. B. A. (2016). Mediating Role of Trust on the Effects of Knowledge Management Capabilities on Organizational Performance. *Procedia - Social and Behavioral Sciences*, 235, 729–738. <https://doi.org/10.1016/j.sbspro.2016.11.074>
- Ali Abbasi, G., Abdul Rahim, N. F., Wu, H., Iranmanesh, M., & Keong, B. N. C. (2022). Determinants of SME's Social Media Marketing Adoption: Competitive Industry as a Moderator. *SAGE Open*, 12(1), 21582440211067220.
- AlNuaimi, B. K., Khan, M., & Ajmal, M. M. (2021). The role of big data analytics capabilities in greening e-procurement: A higher order PLS-SEM analysis. *Technological Forecasting and Social Change*, 169, 120808.
- Alomar, M. A., & de Visscher, C. (2017). Which Factors Can Affect e-Public Procurement Adoption by Private Firms? The Case of Belgium. *Electronic Journal of E-Government*, 15(2), 103-115.
- Alrousan, M. K., & Jones, E. (2016). A conceptual model of factors affecting e-commerce adoption by SME owner/managers in Jordan. *International Journal of Business Information Systems*, 21(3), 269–308.
- Alsaad, A. K. (2015). *Predicting intention to adopt B2B Electronic Commerce in Jordan: The moderating role of trust and dependency*. Universiti Utara Malaysia.
- Alsaad, A., Mohamad, R., & Ismail, N. A. (2017). The moderating role of trust in business to business electronic commerce (B2B EC) adoption. *Computers in Human Behavior*, 68, 157–169.
- Aminah, S., Ditari, Y., Kumaralalita, L., Hidayanto, A. N., Phusavat, K., & Anussornnitisarn, P. (2018). E-procurement system success factors and their impact on transparency perceptions: perspectives from the supplier side. *Electronic Government, an International Journal*, 14(2), 177–199.
- Arshad, R., Noor, A. H. M., & Yahya, A. (2015). Human Capital and Islamic-Based Social Impact Model: Small Enterprise Perspective. *Procedia Economics and Finance*, 31(15), 510–519. [https://doi.org/10.1016/S2212-5671\(15\)01195-8](https://doi.org/10.1016/S2212-5671(15)01195-8)
- Awa, H. O., Emecheta, B. C., & Ojiabo Ukoha. (2012). Integrating TAM and TOE Frameworks and Expanding their Characteristic Constructs for E-Commerce Adoption by SMEs Electronic Commerce (EC). *Informing Science & IT Education Conference (InSITE)*, 18. <https://doi.org/10.1108/JSTPM-04-2014-0012>
- Barney, J. (1991). Special Theory Forum The Resource-Based Model of the Firm: Origins, Implications, and Prospects. In *Journal of Management* (Vol. 17, Issue 1, pp. 97–98). <https://doi.org/10.1177/014920639101700107>
- Belisari, S., Appolloni, A., & Cerruti, C. (2019). Positive and negative impacts of the adoption of e-procurement solutions: The Italian market case. *International Journal of Procurement Management*, 12(2), 219–241.
- Bobowski, S., & Gola, J. (2018). E-procurement in the European Union. *The Asia-Pacific Journal of European Union Studies, Material Powielony Złożony Do Druku*, 17(1–2018), 23–35.
- Brandon-Jones, A., & Kauppi, K. (2018). Examining the antecedents of the technology acceptance model within e-procurement. *International Journal of Operations & Production Management*.
- Brandon-Jones, A., & Carey, S. (2011). The impact of user-perceived e-procurement quality on system and contract compliance. *International Journal of Operations & Production Management*.
- Chen, L. Y. (2017). Perceived Risk and Trust in the Adoption of Cloud Computing Services and Their Effects on Organizational Performance. *International Journal of Advanced Studies in Computer Science and Engineering Ijascse Volume*, 6(5), 24–32. www.ijascse.org
- Chen, Y., Bretschneider, S., Stritch, J. M., Darnall, N., & Hsueh, L. (2021). E-procurement system adoption in local governments: the role of procurement complexity and organizational structure. *Public Management Review*, 1–23.
- Chibani, A., Delorme, X., Dolgui, A., & Pierreval, H. (2018). Dynamic optimisation for highly agile supply chains in e-procurement context. *International Journal of Production Research*, 56(17), 5904–5929.
- Daoud, L. M. (2019). *Factors affecting electronic procurement usage and their influence to Jordanian firm's performance: the moderating role of top management support*. Universiti Utara Malaysia.
- Daoud, L., Marei, A., Al-Jabaly, S., & Aldaas, A. (2021). Moderating the role of top management commitment in usage of computer-assisted auditing techniques. *Accounting*, 7(2), 457–468.
- Daoud, Luay, & Ibrahim, M. (2019). Antecedents and impacts of electronic procurement usage among Jordanian large firms. *Journal of Advanced Research in Business and Management Studies*, 14(1), 52–65.
- Daoud, Luay, & Ibrahim, M. (2018). The factors affecting on e-procurement usage: The moderating role of power. *Journal of Physics: Conference Series*, 1019(1), 12076.
- Gangwar, H. (2017). Cloud computing usage and its effect on organizational performance. *Human Systems Management*, 36(1), 13–26. <https://doi.org/10.3233/HSM-171625>
- Gascó, M., Cucciniello, M., Nasi, G., & Yuan, Q. (2018). *Determinants and barriers of e-procurement: A European comparison of public sector experiences*.
- Gupta, S., Kumar, S., Singh, S. K., Foropon, C., & Chandra, C. (2018). Role of cloud ERP on the performance of an organization: Contingent resource-based view perspective. *International Journal of Logistics Management*, 29(2), 659–675. <https://doi.org/10.1108/IJLM-07-2017-0192>
- Hair, Hult, T. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling* (2nd ed.). Thousand Oakes.
- Hameed, M. A., & Counsell, S. (2014). Establishing relationships between innovation characteristics and IT innovation adoption in organisations: A meta-analysis approach. *International Journal of Innovation Management*, 18(01), 1450007.
- Hameed, M. A., Counsell, S., & Swift, S. (2012). A meta-analysis of relationships between organizational characteristics and IT innovation adoption in organizations. *Information & Management*, 49(5), 218–232.
- Hassan, H., Tretiakov, A., & Whiddett, D. (2017). Factors affecting the breadth and depth of e-procurement use in small and

- medium enterprises. *Journal of Organizational Computing and Electronic Commerce*, 27(4), 304–324.
- Ibem, E. O., Aduwo, E. B., Afolabi, A. O., Oluwunmi, A. O., Tunji-Olayeni, P. F., Ayo-Vaughan, E. A., & Uwakonye, U. O. (2021). Electronic (e-) procurement adoption and users' experience in the Nigerian construction sector. *International Journal of Construction Education and Research*, 17(3), 258–276.
- Ibem, E. O., Aduwo, E. B., Uwakonye, U. O., Tunji-Olayeni, P. F., & Ayo-Vaughan, E. A. (2018). Survey data on e-Procurement adoption in the Nigerian building industry. *Data in Brief*, 18, 823–826.
- Ibrahim, M. (2012). Determining critical factors of e-procurement usage among Malaysian suppliers towards performance impact. *Universiti Utara Malaysia*.
- Ifinedo, P. (2011). An Empirical Analysis of Factors Influencing Internet/E-Business Technologies Adoption By Smes in Canada. *International Journal of Information Technology & Decision Making*, 10(04), 731–766. <https://doi.org/10.1142/S0219622011004543>
- Imam, R. (2022). Regulating the transport sharing economy and mobility applications in Jordan. *International Journal of Business Innovation and Research*, 27(1), 101–120.
- Jain, M., Abidi, N., & Bandyopadhyay, A. (2018). E-procurement espousal and assessment framework: A case-based study of Indian automobile companies. *International Journal of Technology Management & Sustainable Development*, 17(1), 87–109.
- Kayali, M., & Alaraj, S. (2020). Adoption of Cloud Based E-learning in Developing Countries: A Combination A of DOI, TAM and UTAUT. *Int. J. Contemp. Manag. Inf. Technol*, 1(1), 1–7.
- Kozlenkova, I. V., Samaha, S. A., & Palmatier, R. W. (2014). Resource-based theory in marketing. In *Journal of the Academy of Marketing Science* (Vol. 42, Issue 1, pp. 1–21). <https://doi.org/10.1007/s11747-013-0336-7>
- Liu, Q., Sun, S. X., Wang, H., & Zhao, J. (2011). A multi-agent based system for e-procurement exception management. *Knowledge-Based Systems*, 24(1), 49–57.
- Marei, A., Daoud, L., Ibrahim, M., & Al-Jabaly, S. (2021). Moderating role of top management support in electronic procurement usage of Jordanian firms. *Management Science Letters*, 11(4), 1121–1132.
- Marei, A., & Iskandar, E. D. T. B. M. (2019). The impact of Computer Assisted Auditing Techniques (CAATs) on development of audit process: an assessment of Performance Expectancy of by the auditors. *International Journal of Management and Commerce Innovations*, 7(2), 1199-1205.
- Masudin, I., Aprilia, G. D., Nugraha, A., & Restuputri, D. P. (2021). Impact of E-procurement adoption on company performance: Evidence from Indonesian manufacturing industry. *Logistics*, 5(1), 16.
- Mélon, L. (2020). The impact of e-procurement on institutional quality. *Journal of Public Procurement*.
- Mohtaramzadeh, M., Ramayah, T., & Jun-Hwa, C. (2018). B2B e-commerce adoption in Iranian manufacturing companies: Analyzing the moderating role of organizational culture. *International Journal of Human-Computer Interaction*, 34(7), 621–639.
- Nani, D. A., & Ali, S. (2020). Determinants of Effective E-Procurement System: Empirical Evidence from Indonesian Local Governments. *Jurnal Dinamika Akuntansi Dan Bisnis*, 7(1), 33–50.
- Nurdin, N. (2021). Employing Online and Offline Qualitative Interpretive Case Studies in Understanding E-Procurement Effectiveness. *International Journal of Quantitative and Qualitative Research Methods*, 9(1), 23–41.
- Nwankpa, J. K. (2020). *Exploring the Effect of Digital Investment on IT innovation*.
- Oliveira, T., Thomas, M., & Espadanal, M. (2014). Assessing the determinants of cloud computing adoption: An analysis of the manufacturing and services sectors. *Information & Management*, 51(5), 497–510. <https://doi.org/10.1016/j.im.2014.03.006>
- Oyewobi, L. O., Olorunyomi, O. S., Jimoh, R. A., & Rotimi, J. O. B. (2021). Impact of social media usage on performance of construction businesses (CBs) in Abuja, Nigeria. *Journal of Financial Management of Property and Construction*.
- Ramkumar, M., Schoenher, T., Wagner, S. M., & Jenamani, M. (2019). Q-TAM: A quality technology acceptance model for predicting organizational buyers' continuance intentions for e-procurement services. *International Journal of Production Economics*, 216, 333–348.
- Rogers, E. M. (2003). *Diffusion of innovations*, 5th edn (NY, Free Press).
- Saastamoinen, J., Tammi, T., & Reijonen, H. (2018). E-procurement and SME involvement in public procurement of innovations: an exploratory study. *International Journal of Procurement Management*, 11(4), 420–442.
- Sabi, H. M., Uzoka, F. M. E., Langmia, K., & Njeh, F. N. (2016). Conceptualizing a model for adoption of cloud computing in education. *International Journal of Information Management*, 36(2), 183–191. <https://doi.org/10.1016/j.ijinfomgt.2015.11.010>
- Salwani, M. I., Marthandan, G., Norzaidi, M. D., & Chong, S. C. (2009). E-commerce usage and business performance in the Malaysian tourism sector: empirical analysis. *Information Management & Computer Security*, 17(2), 166–185. <https://doi.org/10.1108/09685220910964027>
- Sánchez-Rodríguez, C., Martínez-Lorente, A. R., & Hemsworth, D. (2019). E-procurement in small and medium sized enterprises; facilitators, obstacles and effect on performance. *Benchmarking: An International Journal*.
- Shaltoni, A. M., & Shaltoni, A. M. (2017). From websites to social media : exploring the adoption of internet marketing in emerging industrial markets. *Journal of Business & Industrial Marketing*, 32(7), 1009–1019. <https://doi.org/10.1108/JBIM-06-2016-0122>
- Shatnawi, S. A., Marei, A., Hanefah, M. M., & Eldaia, M. THE EFFECT OF AUDIT COMMITTEE ON FINANCIAL PERFORMANCE OF LISTED COMPANIES IN JORDAN: THE MODERATING EFFECT OF ENTERPRISE RISK

MANAGEMENT.

- Shatta, D. N., Shayo, F. A., & Layaa, J. N. (2020). Determinants of e-procurement adoption model for green procurement in developing countries: Experience from Tanzania. *International Academic Journal of Procurement and Supply Chain Management*, 3(2), 1–18.
- Sheikh, A. A., Rana, N. A., Inam, A., Shahzad, A., & Awan, H. M. (2018). Is e-marketing a source of sustainable business performance? Predicting the role of top management support with various interaction factors. *Cogent Business & Management*, 5(1), 1516487.
- Shukur, B. S., Ghani, M. K. A., & Burhanuddin, M. A. (2018). An analysis of cloud computing adoption framework for Iraqi e-government. *International Journal of Advanced Computer Science and Applications*, 9(8), 104–112. <https://doi.org/10.14569/ijacsa.2018.090814>
- Silva, D. S., Yamashita, G. H., Cortimiglia, M. N., Brust-Renck, P. G., & ten Caten, C. S. (2022). Are we ready to assess digital readiness? Exploring digital implications for social progress from the Network Readiness Index. *Technology in Society*, 68, 101875.
- Stieninger, M., Nedbal, D., Wetzlinger, W., Wagner, G., & Erskine, M. A. (2014). Impacts on the Organizational Adoption of Cloud Computing: A Reconceptualization of Influencing Factors. *Procedia Technology*, 16, 85–93. <https://doi.org/10.1016/j.protcy.2014.10.071>
- Sulaiman, H., & Magaireah, A. I. (2014). Factors affecting the adoption of integrated cloudbased e- health record in healthcare organizations: a case study of Jordan. *Information Technology and Multimedia (ICIMU), 2014 International Conference On*, 102–107. <https://doi.org/10.1109/ICIMU.2014.7066612>
- Teo, T. S. H., Lin, S., & Lai, K. (2009). Adopters and non-adopters of e-procurement in Singapore: An empirical study. *Omega*, 37(5), 972–987.
- Tiwari, S. T. S., Chan, S. W., Ahmad, M. F., & Zaman, I. (2019). Application and implementation of E-procurement technologies in malaysian manufacturing firm. *Int J Supply Chain Manage*, 8, 923.
- Tornatzky, L. G., & Fleischer, M. (1990). The processes of technological innovation. *The Journal of Technology Transfer*, 16(1), 45–46. <https://doi.org/10.1007/BF02371446>
- Truong, D. (2019). Distrust issues in business-to-business e-procurement decisions. *Journal of Enterprise Information Management*.
- Yang, Z., Sun, J., Zhang, Y., & Wang, Y. (2015). Understanding SaaS adoption from the perspective of organizational users: A tripod readiness model. *Computers in Human Behavior*, 45, 254–264. <https://doi.org/10.1016/j.chb.2014.12.022>
- Yusr, M. M. (2016). Innovation capability and its role in enhancing the relationship between TQM practices and innovation performance. *Journal of Open Innovation: Technology, Market, and Complexity*, 2(1), 6. <https://doi.org/10.1186/s40852-016-0031-2>
- Zhu, K., & Kraemer, K. L. (2005). Post-adoption variations in usage and value of e-business by organizations: cross-country evidence from the retail industry. *Information Systems Research*, 16(1), 61–84.



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